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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/826,353	04/05/2001	Naohiro Matsui	PF-2782/NEC/US/mh	3962

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EXAMINER

AHN, SAM K

ART UNIT	PAPER NUMBER
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2634

DATE MAILED: 06/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/826,353

Applicant(s)

MATSUI, NAOHIRO

Examiner

Sam K. Ahn

Art Unit

2634

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 05 April 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 April 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 2.4.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. IDS filed on 10/09/01, paper no.2, has not been considered since the references cited are equivalent with the references cited on the IDS filed on 3/20/03, paper no.4.

### ***Drawings***

2. Figure 3 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### ***Claim Objections***

3. Claims 1-18 are objected to because of the following informalities:  
  
In claims 1, 2, 9, 10 lines 11, 2, 20, 2, respectively, delete "states" and insert "state".  
  
In claim 17, lines 9-10, delete "states, then said supplying current is increased." and insert "state, then increasing said supplying current."  
  
In claim 18, line 2, delete "states, then said supplying current is decreased." and insert "state, then decreasing said supplying current."  
  
Claims 3-8 and 11-16 directly or indirectly depend on claim 1 or 11.

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 3-8 and 11-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 3 and 11, lines 2 and 2, respectively, recite "a pair of a constant current source". One may interpret the claim as having two of the constant current source, when Fig.2 illustrates of having one of each constant (23a) and variable (23b) current source. The specification also describes as recited in the claim, however, from understanding the specification as a whole, it appears that the figure illustrates correctly. Please explain further in regards to this matter.

Claims 4-8 and 12-16 directly or indirectly depend on claim 3 or 11.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-6, 17 and 18 are rejected under 35 U.S.C. 102(e) as being anticipated by Le et al. (Le).

Regarding claims 1 and 17, Le teaches a phase comparator provided in a phase locked loop circuit, said phase comparator (110 in Fig.1) converting a phase difference between first and second input signals into a current signal, wherein said phase comparator comprises; a lock detector (210 in Fig.2) for detecting locked and unlocked states of said phase locked loop circuit to generate a detected signal (up and down pulses, note col.3, line 51 – col.4, line 43), which indicates one of said locked and unlocked states, and a current source (220, 230, 240 and 250 in Fig.2) connected to said lock detector for receiving said detected signal from said lock detector and varying a supply current based on said detected signal. (note col.2, line 55 – col.6, line 26) Le further teaches a step when said detected signal indicates said unlocked states.(see 560 in Fig.5) Le teaches the current source (220, 230, 240 and 250 in Fig.2) having a dual state where for the up pulse, current supplying current is already turned on. (220 and 240) Therefore, the current source increases said supplying current.

Regarding claims 2 and 18, Le teaches all subject matter claimed, as applied to claim 1. Le further teaches the condition when said detected signal indicates said locked state (550), then said current source decreases said

supplying current by turning on the turning on the first set of current sources (220, 230) only.

Regarding claim 3, Le teaches all subject matter claimed, as applied to claim 2. Le further teaches wherein said current source comprises a constant current source for supplying a constant current (220, up current source which is constantly on) and a variable current source (230, down current source which is controlled by the down pulse and varying the current through turning on and off) connected to said lock detector for varying a current based on said detected signal. (note col.3, lines 51-67)

Regarding claim 4, Le teaches all subject matter claimed, as applied to claim 3. Le further teaches wherein said lock detector (210) is connected between an output terminal of said phase comparator (110) and said variable current source (230 and 250).

Regarding claims 5 and 6 Le teaches all subject matter claimed, as applied to claim 4. Le further teaches wherein said phase comparator includes plural current mirror circuits. (353, 345, 347 and 355) Le also teaches wherein each of said plural current mirror circuits comprises a pair of bipolar transistors (345 and 347). (note col.6, line 61 – col.9, line 23 and see Fig.3)

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 9-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Le et al. (Le) in view of Yamawaki et al. (Yamawaki).

Regarding claim 9, Le teaches a phase locked loop circuit (see Fig.1) comprising, an input terminal (111), and output terminal (141), a phase comparator (110) connected to said input terminal, a loop filter (130) connected to said phase comparator, a voltage controlled oscillator (140) connected to said loop filter, and said voltage controlled oscillator connected to said output terminal. Le further teaches said phase comparator receiving a first input signal from said input terminal and a second input signal from a feedback output from the VCO, for converting a phase difference between said first and second input signals into a current signal. (note col.2, lines 19-54) Le further teaches a lock detector (210 in Fig.2) for detecting locked and unlocked states of said phase locked loop circuit to generate a detected signal (up and down pulses, note col.3, line 51 – col.4, line 43), which indicates one of said locked and unlocked states, and a current source (220, 230, 240 and 250 in Fig.2) connected to said lock detector for receiving said detected signal from said lock detector and varying a

supply current based on said detected signal. (note col.2, line 55 – col.6, line 26)

Le further teaches a step when said detected signal indicates said unlocked states.(see 560 in Fig.5) Le teaches the current source (220, 230, 240 and 250 in Fig.2) having a dual state where for the up pulse, current supplying current is already turned on. (220 and 240) Therefore, the current source increases said supplying current.

However, Le does not teach wherein the feedback path between the VCO and the phase comparator is a mixer, but a divider. Le teaches that the divider can be other elements. (note col.2, lines 37-40) Yamawaki teaches, in the same field of endeavor, a mixer (26 in Fig.14) in the feedback path, and also teaches a divider (41 in Fig.13). Yamawaki further teaches that the frequency divider may be given by  $f(rf)/f(if)$ , which would be equivalent to a mixer. Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Le's teaching of implementing a divider with a mixer as it is a matter of a design choice, and further, depending on the market availability, one may choose one over the other.

Regarding claim 10, Le in view of Yamawaki teach all subject matter claimed, as applied to claim 9. Le further teaches the condition when said detected signal indicates said locked state (550), then said current source decreases said supplying current by turning on the turning on the first set of current sources (220, 230) only.



Regarding claim 11, Le in view of Yamawaki teach all subject matter claimed, as applied to claim 10. Le further teaches wherein said current source comprises a constant current source for supplying a constant current (220, up current source which is constantly on) and a variable current source (230, down current source which is controlled by the down pulse and varying the current through turning on and off) connected to said lock detector for varying a current based on said detected signal. (note col.3, lines 51-67)

Regarding claim 12, Le in view of Yamawaki teach all subject matter claimed, as applied to claim 11. Le further teaches wherein said lock detector (210) is connected between an output terminal of said phase comparator (110) and said variable current source (230 and 250).

Regarding claims 13 and 14, Le in view of Yamawaki teach all subject matter claimed, as applied to claim 12. Le further teaches wherein said phase comparator includes plural current mirror circuits. (353, 345, 347 and 355) Le also teaches wherein each of said plural current mirror circuits comprises a pair of bipolar transistors (345 and 347). (note col.6, line 61 – col.9, line 23 and see Fig.3)

***Allowable Subject Matter***

7. Claims 7, 8, 15 and 16 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, and claim objections, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.
8. The following is a statement of reasons for the indication of allowable subject matter: Present application discloses a phase locked loop comprising a phase detector wherein the phase detector comprises a lock detector and a current source. The current source comprises a variable and constant current source. The phase detector further comprises bipolar transistors. Closest prior art, Le, teaches all subject matter claimed. However, Le nor Yamawaki, solely or in combination, does not explicitly disclose the configuration of bipolar transistors as laid out in Fig.2 of the present application.

***Conclusion***

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Johnson teaches a phase locked loop circuitry comprising a phase detector receiving a lock signal.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Sam Ahn** whose telephone number is **(703) 305-0754**.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Stephen Chin**, can be reached at **(703) 305-4714**.

**Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks  
P.O. Box 1450  
Alexandria, VA 22313-1450


**or faxed to:**

**(703) 872-9306**

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA., Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

Sam K. Ahn  
6/13/04

  
**STEPHEN CHIN**  
**SUPERVISORY PATENT EXAMINER**  
**TECHNOLOGY CENTER 2600**